

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
6 May 2005 (06.05.2005)

PCT

(10) International Publication Number
WO 2005/039410 A1

(51) International Patent Classification⁷: A61B 5/0444

(21) International Application Number:
PCT/GB2004/004315

(22) International Filing Date: 13 October 2004 (13.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0324018.1 14 October 2003 (14.10.2003) GB
0324196.5 16 October 2003 (16.10.2003) GB

(71) Applicant (for all designated States except US): THE UNIVERSITY OF NOTTINGHAM [GB/GB]; University Park, Nottingham NG7 2RD (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): CROWE, John, Andrew [GB/GB]; School of Electrical and Electronic Engineering, The University of Nottingham, University Park,

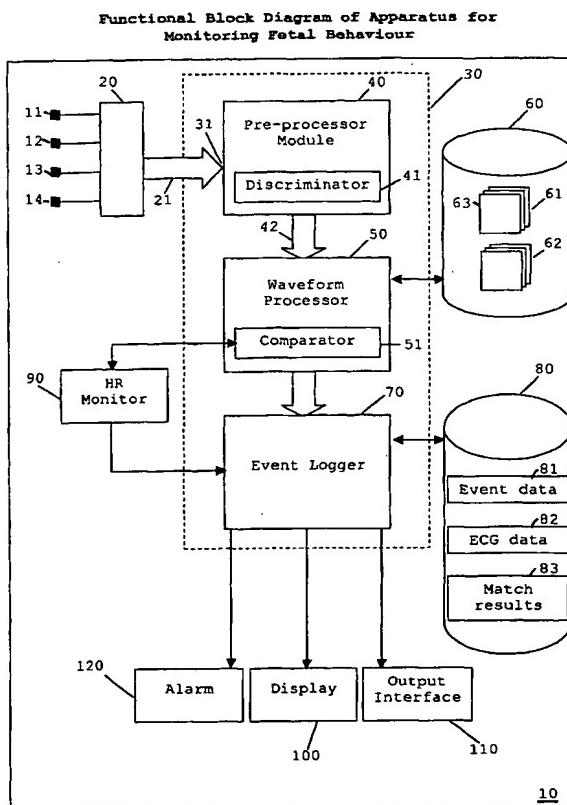
Nottingham NG7 2RD (GB). JAMES, David [GB/GB]; School of Human Development, Nottingham University Medical School, The University of Nottingham, University Park, Nottingham NG7 2RD (GB). HAYES-GILL, Barrie, Robert [GB/GB]; School of Electrical and Electronic Engineering, The University of Nottingham, University Park, Nottingham NG7 2RD (GB). BARRATT, Carl, William [GB/GB]; School of Electrical and Electronic Engineering, The University of Nottingham, University Park, Nottingham NG7 2RD (GB). PIERI, Jean-Francois [FR/GB]; School of Electrical and Electronic Engineering, The University of Nottingham, University Park, Nottingham NG7 2RD (GB).

(74) Agent: CHARIG, Raymond; Eric Potter Clarkson, Park View House, 58 The Ropewalk, Nottingham NG1 5DD (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

[Continued on next page]

(54) Title: FETAL SURVEILLANCE



(57) Abstract: Fetal behaviour is monitored by receiving ECG data from a set of electrodes attached to a maternal body. A waveform pre-processor identifies a succession of fetal ECG complex waveforms within the received data and a waveform processor determines differences in the succession of fetal ECG complex waveforms over time. An event logger determines from the determined differences a number of fetal movements during the period of time. Fetal spatial presentation and/or position within the uterus may also be determined from fetal ECG data acquired from a plurality of electrodes positioned on the maternal abdomen in a predetermined configuration. A number of fetal ECG complex waveforms are identified within the data, and each of the waveforms is compared with a set of predetermined fetal ECG complex templates ascribed to the predetermined electrode configuration to determine a template that best matches the identified fetal ECG waveforms.

WO 2005/039410 A1



AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.